Mathematic Standards Matrix
CABINETMAKING
January 12, 2009

	CABINETMAKING Standards/Measurement Criteria	MATH STANDARDS **Strand #, Concept #, Grade Level** Performance Objective # *(College Work Readiness Level Standards are italicized)*
STANDARD 1.0 - DEMONSTRATE BUSINESS PRACTICES FOR A WOODWORKING BUSINESS		
1.1	Estimate supplies, materials and labor costs	**Strand 1: Number and Operations, Concept 3: Estimation, High School Level** PO 2: Use estimation to determine the reasonableness of a solution. PO 3: Determine when an estimate is more appropriate than an exact answer.
1.2	Develop a materials order from a cut list and plan	**Strand 1: Number and Operations, Concept 3: Estimation, High School Level** PO 3: Determine when an estimate is more appropriate than an exact answer. **Strand 2: Data Analysis, Probability, and Discrete Mathematics, Concept 1: Data Analysis (Statistics), High School Level** PO 2: Organize collected data into an appropriate graphical representation with or without technology.
1.3	Explain product quality standards	See Note
1.4	Manage customer relations	See Note
STANDARD 2.0 - SAFE WOOD PRODUCTS MANUFACTURING		
2.1	Work safely in a woodworking shop	See Note
2.2	Maintain safe work attire and appearance	See Note
2.3	Wear appropriate personal protective equipment (e.g., eye protection, ear protection, impact hat, etc.)	See Note
2.4	Use equipment safety features correctly	See Note
2.5	Use proper lifting techniques	See Note

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2.6	Examine health-related problems that may result from exposure to hazardous materials in the woodworking shop	See Note
2.7	Examine principles and methods of dust collection	See Note
2.8	Adhere to government regulations (e.g., OSHA, EPA, DNR) in the woodworking shop	See Note
2.9	Adhere to lockout / tag out rules and procedures	See Note
2.10	Handle, use and store materials according to MSDS sheets	See Note
2.11	Apply fire safety rules and procedures	See Note

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STANDARD 3.0 - PERFORMING BASIC CABINETMAKING SKILLS		
3.1	Solve woodworking problems using basic math	**Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level** PO 2: Solve formulas for specified variables.
3.2	Solve manufacturing and construction word problems	**Strand 1: Number and Operations, Concept 2: Numerical Operations, High School Level** PO 1: Solve word problems involving absolute value, powers, roots, and scientific notation. PO 3: Calculate powers and roots of rational and irrational numbers. **Strand 1: Number and Operations, Concept 3: Estimation, High School Level** PO 2: Use estimation to determine the reasonableness of a solution. PO 3: Determine when an estimate is more appropriate than an exact answer. **Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level** PO 2: Solve formulas for specified variables.
3.3	Calculate linear feet, square feet, and board feet	**Strand 3: Patterns, Algebra, and Functions, Concept 3: Algebraic Representations, High School Level** PO 2: Solve formulas for specified variables.
3.4	Tally accurately	See Note
3.5	Measure accurately	**Strand 1: Number and Operations, Concept 1: Number Sense, High School Level** PO 3: Express that the distance between two numbers is the absolute value of their difference.
3.6	Lay out straight and angled cuts accurately	See Note
3.7	Convert standard and metric measurements	**Strand 4: Geometry and Measurement, Concept 4: Measurement, High School Level** PO 1: Use dimensional analysis to keep track of units of measure when converting
3.8	Check stock and/or assemblies for squareness.	See Note
3.9	Determine levelness and plumbness of surfaces, using a level.	See Note

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3.10	Handle/store materials.	See Note
3.11	Recognize materials.	See Note
3.12	Maintain/make minor adjustments to hand tools.	**Strand 1: Number and Operations, Concept 3: Estimation, *College Work Readiness Level*** *PO 1: Recognize the limitations of estimations by assessing the amount of error resulting from estimation and determining whether the error is within acceptable tolerance limits.*
STANDARD 4.0 - PRACTICE SAFE AND EFFECTIVE USE OF HAND AND PORTABLE POWER TOOLS		
4.1	Use steel rules/tapes, marking gauges and T-bevels correctly	See Note
4.2	Utilize planes and cabinet scrapers to smooth surfaces	See Note
4.3	Utilize wood chisels to notch or mortise stock	See Note
4.4	Drive and set nails and screws	See Note
4.5	Fasten materials using a pneumatic stapler or nailer	See Note
4.6	Utilize a circular saw to make straight, beveled and compound angle cuts	See Note
4.7	Utilize a saber/jig saw to plunge/cut curves	See Note
4.8	Drill holes with a portable power drill	See Note

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4.9	Utilize a power drill to bore holes to a specified depth	See Note
4.10	Create pocket screwed joints using a drill with jig	See Note
4.11	Utilize a router to shape edges and cut a groove, dado and rabbet	See Note
4.12	Utilize a router with a dovetail jig	See Note
4.13	Utilize plate and biscuit joiners for square and angled joints	See Note
4.14	Utilize a sander for roughing and finishing	See Note
4.15	Clean and maintain hand and portable power tools	See Note
4.16	Utilize a belt sander and grinder to scribe cut a product	See Note

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STANDARD 5.0 - PRACTICE SAFE AND EFFECTIVE USE OF STATIONARY WOODWORKING MACHINES		
5.1	Utilize a table saw to make rip, cross, miter, bevel and groove cuts	See Note
5.2	Change and set up blades on a table saw	See Note
5.3	Utilize a radial saw to make cross, miter and compound angle cuts	See Note
5.4	Change blade and adjust squareness of a radial saw	See Note
5.5	Cut vertical with a panel saw	See Note
5.6	Change blade on a panel saw	See Note
5.7	Cut arcs and circles with a band saw	See Note
5.8	Set up, adjust and bore using a drill press	See Note
5.9	Utilize a jointer to square, bevel, chamfer, or flatten stock	See Note
5.10	Utilize a router in a router table	See Note
5.11	Utilize a surfacer to plane and smooth surfaces	See Note

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5.12	Create edges and curves utilizing a shaper with a fence, collar or dead stop	See Note
5.13	Utilize a power feed unit with a table saw, shaper or jointer	See Note
5.14	Utilize a bench morticer	See Note
5.15	Finish edges using an edge bander	See Note
5.16	Set up and utilize a lathe for woodturning	See Note

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STANDARD 6.0 - EXAMINE COMPUTERS AND COMPUTER-CONTROLED EQUIPMENT IN WOODWORKING		
6.1	Find information on (Computer Aided Drafting and Design) CADD drawings	See Note
6.2	Investigate (Computer Aided Manufacturing) CAM software for programming Computer Numerical Control (CNC) manufacturing equipment	See Note
6.3	Explore CNC equipment and equipment operations	See Note
6.4	Demonstrate CNC equipment operation (actual or simulated)	**Strand 4: Geometry and Measurement, Concept 1: Geometric Properties, High School Level** PO 2: Visualize solids and surfaces in 3-dimensional space when given 2-dimensional representations and create 2-dimensional representations for the surfaces of 3-dimensional objects. PO 3: Sketch and describe the properties of a 2-dimensional figure that is the result of two or more transformations. PO 4: Determine the effects of a single transformation on linear or area measurements of a 2-dimensional figure.
6.5	Enter CNC programs and run a machine to produce a part	See Note
6.6	Explore the application of 3-dimensional technology in woodworking	**Strand 4: Geometry and Measurement, Concept 1: Geometric Properties, High School Level** PO 2: Visualize solids and surfaces in 3-dimensional space when given 2-dimensional representations and create 2-dimensional representations for the surfaces of 3-dimensional objects.

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STANDARD 7.0 - INTERPRET PLANS AND PRINTS		
7.1	Extract information from plans and specifications	See Note
7.2	Read and interpret a floor plan	See Note
7.3	Verify design plans with field measurements	See Note
7.4	Interpret a cut sheet	See Note
7.5	Create a material list	See Note
7.6	Specify wood stock for compatibility of grain and color	See Note
7.7	Construct and install wood products from plans	**Strand 2: Data Analysis, Probability, and Discrete Mathematics, Concept 1: Data Analysis (Statistics), High School Level** PO 2: Organize collected data into an appropriate graphical representation with or without technology.

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STANDARD 8.0 - CUT AND SHAPE STOCK		
8.1	Mill rough lumber to create S4S stock	See Note
8.2	Cut panelized materials to size and shape	See Note
8.3	Manufacture woodturnings	See Note
8.4	Manufacture wood moldings	See Note
8.5	Re-saw wood parts when required	See Note

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STANDARD 9.0 - USE WOOD VENEERS		
9.1	Cut and edge veneer for joining	See Note
9.2	Join veneer sheets with glue and tape	See Note
9.3	Use and machine wood panel products (i.e., particle board, MDF)	See Note
9.4	Apply veneer with appropriate adhesive using a platen or vacuum press	See Note
9.5	Trim excess veneer	See Note
9.6	Prepare veneer surface for finishing	See Note

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STANDARD 10.0 - DEMONSTRATE PRINCIPLES OF JOINERY		
10.1	Explain the purpose and appropriate applications of common joints	See Note
10.2	Layout and make butt joints using dowels, screws, biscuits, and/or pocket screws	See Note
10.3	Layout and make a dado joint	See Note
10.4	Layout and make a rabbet joint	See Note
10.5	Layout and make a half-lap joint	See Note
10.6	Layout and make a miter joint	See Note
10.7	Layout and make a tongue and groove joint	See Note
10.8	Layout and make a mortise and tenon joint	See Note
10.9	Layout and make a dovetail joint	See Note
10.10	Layout and make a finger join	See Note

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STANDARD 11.0 - ASSEMBLE WOOD PRODUCTS USING FASTENERS, ADHESIVES AND HARDWARE		
11.1	Explain the purpose and appropriate applications of common fasteners	See Note
11.2	Use various fasteners and Ready To Assemble (RTA) connectors in manufacturing a wood product	See Note
11.3	Explain the purpose and appropriate applications of common woodworking adhesives	See Note
11.4	Use adhesives appropriate to the application	See Note
11.5	Apply clamping devices	See Note
11.6	Assemble drawer components	See Note
11.7	Use fasteners and levelers to install products	See Note
11.8	Fasten stock with metal fasteners (for example, nails, screws, staples, and other mechanical fasteners)	See Note
11.9	Glue boards edge to edge	See Note

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11.10	Construct case/box	See Note
11.11	Assemble panel doors	See Note
11.12	Attach molding/trim	See Note
11.13	Fasten top to casework	See Note
11.14	Install cabinet hardware	See Note
11.15	Reinforce joints with block	See Note

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STANDARD 12.0 - APPLY WOOD VENEERS AND PLASTIC LAMINATES		
12.1	Cut laminates with appropriate saw blades and router bits	See Note
12.2	Seam two pieces of laminate	See Note
12.3	Apply adhesive	See Note
12.4	Apply edge banding	See Note
12.5	Apply laminate to core	See Note
12.6	Apply wood edges	See Note
12.7	Cut plastic to size	See Note
12.8	Fit plastic laminate joints	See Note
12.9	Trim edges	See Note
12.10	Machine/fabricate solid surface materials	See Note

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STANDARD 13.0 - DEMONSTRATE FINISHING MATERIALS AND PROCESSES		
13.1	Explain the purpose and appropriate applications of various types of finishes and finishing processes	See Note
13.2	Follow a finish schedule	See Note
13.3	Apply filler to a wood surface	See Note
13.4	Apply a wash coat to a wood surface	See Note
13.5	Apply a seal coat to a wood surface	See Note
13.6	Select and use appropriate abrasive types and grit sizes	See Note
13.7	Stain a wood surface	See Note
13.8	Apply clear coating finishes to wood surfaces	See Note
13.9	Apply pigmented finishes to wood surfaces	See Note
13.10	Apply safe and approved (OSHA, EPA, DNR) methods for cleaning finishing tools	See Note
13.11	Remove excess glue	See Note

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13.12	Swell dents	See Note
13.13	Repair blemishes/touch up finishes	See Note
13.14	Select finishing materials for compatibility	See Note

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